

What is claimed is:

1 1. A liquid-crystal display device comprising:
2 a plurality of address wiring formed on an insulating
3 substrate;
4 a gate insulating film formed on said address wiring;
5 a plurality of data wiring formed in a manner that said
6 data wiring and said address wiring cross each other;
7 an upper layer insulating film grown on said data wiring;
8 a transparent electrode, composed of a transparent
9 conductive film, formed on said upper layer insulating film and
10 placed in each of picture element areas surrounded by said
11 address wiring and said data wiring;
12 a thin-film transistor section, disposed in each of
13 picture element areas, used to selectively connect said data
14 wiring with said transparent electrode by a gate connected to
15 said address wiring; and
16 a capacitor section, disposed in each of picture element
17 areas, composed of a first electrode formed on said gate
18 insulating film using the same conductive film as used for said
19 data wiring, a second electrode formed on said upper layer
20 insulating film using the same transparent conductive film as
21 used for said transparent electrode and said upper layer
22 insulating film.

1 2. The liquid-crystal display device according to
2 claim 1, wherein said second electrode is formed with an
3 extended part of said transparent electrode.

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1 3. The liquid-crystal display device according to
2 claim 1, wherein said first electrode is connected to said
3 address wiring using the same transparent conductive film as
4 used for said transparent electrode.

1 4. The liquid-crystal display device according to
2 claim 1, wherein said first electrode is connected to said
3 address wiring using the same conductive film as used for said
4 data wiring.

1 5. The liquid-crystal display device according to
2 claim 1, wherein a part of said capacitor section is formed in
3 a manner that it is superimposed through said gate insulating
4 film on said address wiring.

1 6. The liquid-crystal display device according to
2 claim 1, wherein a width of said address wiring is constant in
3 said picture element area and wherein said capacitor section
4 is formed in a manner that the whole of it is superimposed through
5 said gate insulating film on said address wiring.

1 7. The liquid-crystal display device according to
2 claim 1, wherein the whole of said thin-film transistor section
3 and of data wiring is covered with said upper layer insulating
4 film or said transparent conductive film.

1 8. The liquid-crystal display device according to
2 claim 1, wherein said upper layer insulating film is thinner
3 than that of said gate insulating film or a dielectric constant

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4 of said upper layer insulating film is larger than that of said
5 gate insulating film.

1 9. The liquid-crystal display device according to
2 claim 1, wherein said upper layer insulating film is a complex
3 film composed of a plurality of insulating films.

1 10. The liquid-crystal display device according to
2 claim 1, wherein said upper layer insulating film is composed
3 of, at least, one kind of a silicon nitride film, silicon oxide
4 film and metal oxide film.

1 11. The liquid-crystal display device according to
2 claim 1, wherein said auxiliary capacitive common wiring is
3 formed in parallel to said address wiring and wherein said
4 capacitor section is formed in a manner that it is partially
5 or totally superimposed on said auxiliary capacitive common
6 wiring.

1 12. The liquid-crystal display device according to
2 claim 11, wherein connections are made at, at least, two points
3 between said first electrode and said address wiring or between
4 said first electrode and said auxiliary capacitive common
5 wiring.

1 13. The liquid-crystal display device according to
2 claim 1, wherein said capacitor section is formed by connecting,
3 in parallel, a first capacitive component composed of a part
4 of said address wiring, said first electrode and said gate

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5 insulating film put between said address wiring and said first
6 electrode with a second capacitive component composed of said
7 first electrode, said second electrode and said upper layer
8 insulating film put between said first electrode and said second
9 electrode.

1 14. A method for producing the liquid-crystal display
2 device of claim 1, comprising the steps of:

3 forming a plurality of address wiring on an insulating
4 substrate;

5 forming a gate insulating film on said address wiring;

6 forming a plurality of data wiring on said gate insulating
7 film in a manner that said data wiring and address wiring cross
8 each other;

9 forming a thin-film transistor used to selectively
10 connect said data wiring with said transparent electrode
11 disposed in each of picture element areas by a gate connected
12 to said address wiring, in each of picture element areas
13 surrounded by said address wiring and data wiring;

14 forming a first electrode using the same conductive film
15 as used for said data wiring;

16 forming an upper layer insulating film on said first
17 electrode;

18 forming a second electrode using the same transparent
19 conductive film as used for said transparent electrode; and

20 forming said capacitor section using said first electrode,
21 said second electrode and said upper layer insulating film.

1 15. The method for producing the liquid-crystal

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2 display device according to claim 14, wherein said second
3 electrode is formed with an extended part of said transparent
4 electrode in said capacitor section.

1 16. The method for producing the liquid-crystal
2 display device according to claim 14, wherein said first
3 electrode is connected to said address wiring using the same
4 transparent conductive film as used for said transparent
5 electrode.

1 17. The method for producing the liquid-crystal
2 display device according to claim 14, wherein said first
3 electrode is connected to said address wiring using the same
4 conductive film used for said data wiring.

1 18. A method for producing the liquid-crystal display
2 device of claim 11, comprising the steps of:

3 forming a plurality of address wiring on an insulating
4 substrate;

5 forming a plurality of auxiliary capacitive common wiring
6 in a manner that it is disposed in parallel to said address
7 wiring;

8 forming a gate insulating film on said auxiliary
9 capacitive common wiring;

10 forming a plurality of data wiring on said gate insulating
11 film in a manner that said address wiring and data wiring cross
12 each other;

13 forming a thin-film transistor used to selectively
14 connect said data wiring with said transparent electrode

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15 disposed in each of picture element areas by a gate connected
 16 to said address wiring, in each of picture element areas
 17 surrounded by said address wiring and data wiring;

18 forming said first electrode using the same conductive
 19 film as used for said data wiring;

20 forming said upper insulating film on said first
 21 electrode;

22 forming said second electrode using the same transparent
 23 conductive film as used for said transparent electrode; and

24 forming said capacitor section using said first electrode,
 25 said second electrode and said upper layer insulating film in
 26 a manner that said capacitor is partially or totally
 27 superimposed on said auxiliary capacitive common wiring.

Sub A' → 19. The method for producing the liquid-crystal
 2 display device of claim 13 according to claim 14, wherein said
 3 first electrode is connected to said transparent electrode and
 4 said second electrode is connected to said address wiring and
 5 wherein said capacitor section is mounted in a manner that it
 6 is superimposed on a part of said address wiring.

1 20. A method for producing the liquid-crystal display
 2 device of claim 4, comprising the steps of:

3 forming a plurality of address wiring on an insulating
 4 substrate;

5 forming a gate insulating film on said address wiring;

6 forming, in said gate insulating film, a through hole
 7 which reaches said address wiring;

8 forming a plurality of data wiring on said gate insulating

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9 film in a manner that said address wiring and data wiring cross
10 each other;

11 forming a thin-film transistor used to selectively
12 connect said data wiring with said transparent electrode
13 disposed in each of picture element areas by a gate connected
14 to said address wiring, in each of picture element areas
15 surrounded by said address wiring and data wiring;

16 forming said first electrode using the same conductive
17 film used for said data wiring;

18 connecting said first electrode to said address wiring
19 via said through hole formed in said gate insulating film;

20 forming said upper layer insulating film on said first
21 electrode;

22 forming said second electrode using the same transparent
23 conductive film as used for said transparent electrode; and

24 forming said capacitor section using said first electrode,
25 said second electrode and said upper layer insulating film.

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